Department of Defense Project Manager - Mobile Electric Power



Fall Technical and Marketing Septemberemoe

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Acting DOD Project Manager - Mobile Electric
Power



Presentation Outline





Requirements & Challenges

PM MEP Path Ahead

- Current Programs Under Contract
 - Power Source Modernization Strategy
- Near Term BusinessOpportunities

Technology Thrusts



Mobile Electric Power History

DoDD

4120.11

PM-MEP

CHARTER

Exorbit Southeast Asia Demand for Vietna Electric m Proliferation: 2,000

Different

Medeletiv

Logistical

Support

Makes,

Sizes

1967
DOD Develope
Ad Hoc
Working Group
Establish
ed

DOD Project Manager -Mobile Electric

Environmental Control Units (ECU) Experienced Similar

PM-MEP Mission

"Establish,
Maintain
and Provide a DOD
Standard Family of
Generating Sources
for Maximum DOD
Component Use"

U.S Army Designated as Lead Standardization

> Joint Operating Procedures

Joint Operating
Procedures
Management and
Standardization of
Mobile Electric
Power
Generating Sources

Army Regulation 700-101 AFJI 63-110 NAVFACINST

MCO 11310.8C

3

DOD Project Manager Mobile Electric Power

Mission
Provide a Modernized

Department of Defense
Standard Family of Mobile
Electric Power Generating
Sources for All Services from
Small, 0.5kW Manportable
Generators to Large, 920kW
and Greater Prime Power

Systems or the Soldier, Sailor, Airman, Marine

JOP

Army Regulation 700-101 AFJI 63-110 NAVFACINST 4120.12 MCO 11310.8C DLAI 4120.11 Joint Operating Procedures
Management and
Standardization
of Mobile Electric Power
Generating Sources

PM MEP Organization

DOD Project Manager Mobile Electric

Mr. Paowethard

Deputy Project

Secretary

Ms. Nancy El

Mechrafi

LCMC Partnership

Logisti cs Divisio h Alan Coady Engineerin g Pivision Parrish Business Manageme nt Vacant CECOM LRC

Mr. Charles

hompson

CECOM CERDEC

Mr. Christophe

Bolton

Product Manager Small Power LtColSourceswers

USMC

Product Manager Medium Power LTC J SourceFeher USA Product Manager Large Power LTC JSPHTCEReher

CECOM

PRD

Mr.

Narinder

Gulati

USA

Vacant USAF Position

Mobile Electric Power Managed Items

Small Sets

- 2kW Military Tactical Generator, Manportable/Skid Mounted, Diesel/JP8 Fueled, AC(60Hz) and DC(28VDC)
- 3kW Tactical Quiet Generator, Skid Mounted, Diesel Fueled (60 Hz and





Power Unit/Power Plant (PU/PP)

- Trailer Mounted Tactical Quiet Generators in the 3kW, 5kW, 10kW, 15kW, 30kW, 60kW, 100kW, and 200kW Power Ratings.
- 20 Different Models That Use 4
 Different But Sta





Medium Sets

 5kW, 10kW, 15kW, 30kW, and 60kW, Skid Mounted, Diesel Fueled Tactical Quiet Generator, 60Hz and 400Hz





Auxiliary Power Units

- 5kW 28 VDC (A Pol 6) on M557
- 10kW Shelter- Mounted APU for use in Shelters such as SICPS





Improved Environmental Control Units

New Generation Legistry
Utilizing Zero Ozone Depleting
Refrigerants.

Ruggedized Form, Fit, and Function Replacement

Systems with Embedded

Large Sets

- 100kW and 200kW Tactical Quiet Generator (TQG), Skid Mounted, Diesel Fueled, 60Hz
- 920kW Deployable Power Generation and Distribution S





Power Distribution Illumination System Electric (PDISE)

Next Generation of Man-portable, Reliable, Modular, Quick Assembly Standardized Electrical Management and Distribution System

46 AMPPRASE DISTRIBUTION

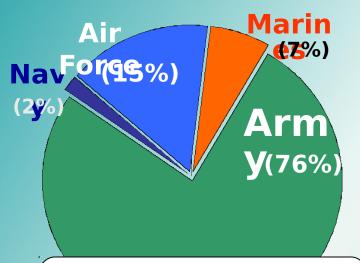
40'AMP/PHASE DISTRIBUTION
60 AMP DISTRIBUTION
SYSTEM
100 AMP/PHASE FEEDER
SYSTEM
200 AMP/PHASE FEEDER
SYSTEM
UTILITY RECEPTACLE AND

LIGHTING KIT



Requirement and Challenges

Power Requirements



		Army	% Army	Qty	%	
	Size <u>Size</u> Fielded	# Req'd*	<u>Total</u>	<u>Fielded</u>	!	
	2kW	9,576	14%	8,336		
	87% 3kW 47%	19,122	29%	9,062		
	5kW	14,779	22%	8,857		
	60% 10kW 73%	12,001	18%	8,733		
	15kW 68%	4,370	7 %	2,959		
	30kW 76%	3,085	5%	2,358		
MIL-STD =	60kW M共存次 Standard	2,950	4%	1,688		
First Generation 72007 DPG DS sel Engine Generator 1975 25						

* BOIP05

Second Generation, Modernized, Sees Ingine Generator Set 2.018

MIL-STD =

TQG = Tactic4PQuiet Generator

62%

2kW thru 920kW Generator Sets (Does Not Include APUs)

Requirements

66,451 Army Navy 1,540 Air Forc 23,340 Marines 6,423 **Total 87,754**

Fielded MII_STD

MIL SID	140		
24,433	42,018		
684	856		
3,500	9,840		
0	6,509		
28 617	59.223		

Data Thru Jun 06

Current Army Priorities

- GWOT
- TOC Central

Power

- Modularity
- **Modernization**

Tactical Electric Power Families / Generations

nse Standard Family of **Mobile Electric Power Generating**

MIL-STD

Military Aging, tandard First Generation **DOD** Standard **Family of Mobile Electric Power Generating Sources**

• 37 **Generator Set** Models

Sizes 0.5kW

Through

750kW



Generator 47 MIL STD (Military Standard)

TQG

Tactical Quiet Modermized; Modermized **Second Generation DOD Standard Family of Mobile Electric Power Generating Sources**

- 18 Generator Set Models
- Sizes 2kW Through 920kW
- All Diesel Engines
- R&D On-going for Some **Models**



Average Annual Cost Per

\$9.58

Generator 2

Next Generation

Power Sources

LAMPS STEP Large Advanced

AMMPS

Advanced Medium Mobile Power Sources 12 Generator Set Models

5kW through 60kW Sizes

Small Tactical Electric Power

Less Than 3kW Sizes **Procurement** ~ 2013

100kW through **1mW Sizes**

Procurement ~ 2018

Mobile Power

Sources

Drocuromont

- Leverage Commercial Technologies
- Minimize Number of Sizes and Models
- Use Proven Technologies
- Replace Entire DOD Generator **Fleet**

Approximately Every 15 Years

Maximize Competition

Average Annual

Generator 3

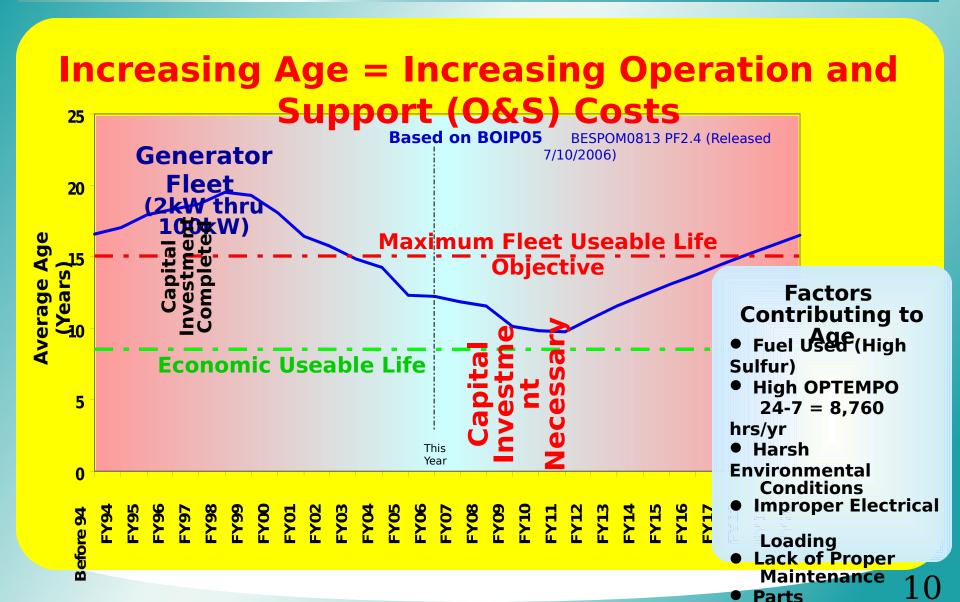
\$8,14

Next

Generation

TOG (Tactical Quiet Generator)

Generator Set Age



IECU Challenge (Improved Environmental Control Unit)

- Approximately 17,800 MIL-STD ECU
 Systems
 currently fielded in sizes 9k, 18k, 36k and
 54k BTUH
- Current ECUs do not comply with the Clean Air Act
 2010 Mandate for Ozone Depleting Refrigerants
- IECUs will comply with EPA Clean Air Act
- Only 60k BTUH IECU currently funded
- State of the critical cooling ECU's provide



PM MEP Path Ahead



Current Programs

R & D

Advanced Medium Mobile Power Sources (AMMPS)

Onan/Cummins and

DRS -

Fermont

Improved Environmental Control Unit (60k BTUH)

DRS - Keco

(IECU)

Production

2kW Military Tactical Generator (MTG)

Dewey

Flectronics

3kW Tactical Quiet Generator (TQG)

DRS/Fermont

5kW, 10kW, 15kW TQG

DRS/Fermont

30kW & 60kW TOG

MCII

100kW & 200kW TQG

DRS/Fermont

Deployable Power Generation & Distribution System

DRS - ESSI

(DPGDS)

Distribution Illumination System Electric

Tobyhanna Army Depot

DISE)

TRANSITIONING to Army Working Capital Fund

5kW 28VDC Auxiliary Power Unit (APU)

Goodman-Ball

10kW Shelter-mounted APU

Chenega

Power Source Modernization Strategy Acquisition Curr ent Strategy **TQG** Voor Develop & Field RDTE **OPA** Power Capabilities using Phased Medium **Generator Sets Development** 5kW - 60kW **OPA** RDTE **Approach** Leverage **TQG** Commercial **Technologies RDTE OPA** Small Maximize Generator Competition Sets to meet Military 3kW & Smaller **RDTE OPA** Unique Requirements TOG Replace Generator Sets ~ 17 Years **RDTE OPA** Large Cascade New Generator RDTE Sets 100kW - 920kW **TOG** = Tactical Quiet Generator AMMPS = Advanced Medium Mobile Power Sourd SEP = Styplitiscaisal Electric Power (Second Generation, Modernized, (Next Generation, Medium Mobile Electric Power Next New Capabi **Diesel Engine Generator Sets)** Generating Sources) - 5 - 60kW 1990 1995 2000 2005 2010 2020

Near Term Business Opportunities

Distribution Illumination System Electric (DISE)

Solicitation Release1Q - 2Q FY07





- Switchboxes for Power Units / Power Plants
 - Solicitation Release1Q 2Q FY07

Improved Environmental Control Units (IE

- 9k, 18k, 36k, BTUH sizes
- Solicitation Release FY08 (Pending HQDA funding)





Power Distribution Illumination System Electric (PDISE)

LtCol Thomas S. Bowers, USMC

Description-

PDISE: A set of man portable power distribution components allowing the distribution of power within a tactical unit. The components consist of four different distribution boxes plus associated cables and a lighting system operational

Characteristics/Performance:

Two feeder systems (M200 and M100) Two distribution systems (M40 and M60) Utility receptacle and lighting system (M46) Operating Temp -25°F to +120°F

M46 M200 M100 M40 M60 Utility

Kit

Weight (lbs) 140

Improvements:

Ability to manage power distribution. Disconnect low priority loads.

 Tobyhanna Army Depot (FY05 thru FY06)

Benefits/Capabilities

Expeditionary Attributes

- Distribute Power
- Ruggedized
- **Uses Military Standard Connectors**

Quality Power

Consolidates Power Sources

Requirements Documents

Title

Date

App'd by

Betielotumanc

20 April 1992

CECOM

Requires Update

Specificatio

For PDISE MIL-REF-53126

Milestones Achieved/Scheduled

- Placed additional order with Tobyhanna **Army Depot using FY06 Supplemental** Funding (\$6.4M)
- Completed Power distribution evaluation program (CERDEC)
- Award competitive contract in 2QFY07

PDISE

Power Distribution Illumination System



WITHOUT PDISE

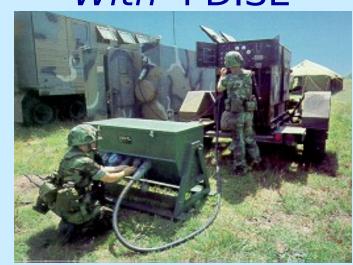


Electrical

S



With PDISE





Improved Environmental Control Unit (IECU) - 9k, 18k, 36k BTUH **Systems** LtCol Thomas S. Bowers

Description-

Provide cooling, heating and dehumidification to soldiers and materiel systems. Requirement for IECUs derives from the Clean Air Act of 1990, which will ban production of MIL-STD ECUs after 2010 due to ozone depleting refrigerants.

 New generation of ECUs to replace the current

Military Standard (MIL-STD) family of ECUs.

- IECUs utilize zero ozone depleting refrigerants.
- · Form, fit and function replacement to current MIL-STD ECUs.
- Procurement based on performance based requirements vs. technical data package drawings.

<u>Key</u> Contractor:

Approved

TBD

nts

Title Date App'd by

Status Army G-3 Oct 2004

IECU

CARDS #16123

• Reduced system weight by 10 - 15%

- Reduced power consumption by 25%
- Soft start (i.e. reduced inrush current)
- Increased reliability: MTBF = 2100 vs. 960 hrs
- Increased supportability due to readily available commercial components
- Logistics footprint is greatly reduced by

weight IECUs that require much less electrical

power and, consequently, less fuel and potentially downsized generators IFCUs utilize zero ozone-depleting

regrigerant

 IECUs are designed for "military environment". Able to survive "military"

handling and transportation requirements.

- NBC filtration compatible and EMP/EMI protected
- Operate at wider operating temperatures
- More ruggedized than commercial ECUs.
- · Embedded diagnostics.
- Automatic safety controls.
- · Remote control capability.

Milestones Achieved/Scheduled

Solicitation Release FY08

Technology Thrusts

Technology Thrusts Where We Are Pushing the Envelope

Easier Deployment

(More per aircraft/ship)

- Less Weight per kW
 - Increased power dens
 - Lightweight materials
- Less volume per kW
 - Increased power dens
 - Improved packaging/ integration

Easier Sustainment

(Less supplies and manhours needed to operate)

- Less Fuel Consumption
 - Increased efficiency
 - Better load management/power

distribution

- More Reliable
 - Fault tolerant design
 - Embedded prognostics/diagnostics
 - Less maintenance hours

Less Life Cycle Cost

- Less Initial Cost
 - Increased use of

commercial components

- Modularity
- Less Fuel Consumption
- **More Reliable**
- **Longer Life**
 - Improved reliability

Improved

Capability

- Less Weight
 - Easier/faster to move
 - Easier to move off road/non-prepared positionshutdowns;
 - More vehicle payload in APU/trailer applications allows scheduled shutdown versus
- Less Noise
 - Use further forward
 - Less communication/rest interference
- Less Fuel Consumption
 - Runs longer on same fuel
 - Fewer fuel trucks doing convoys/fewer soldier Manportable manhours spent refueling

- More Reliable
 - Runs longer between shutdowns
 - Prognostics predict impending
- unexpected shutdown
- Less than 1kW
- New units to go where power was previously

not available

Potential Technologies

- Advanced High Speed Diesel Engines
- Advanced Environmental Control Systems & combined Power/ECU Systems
- Power Electronics & Digital Controls
- Composite Materials & L Alloys
- Diagnostic & Prognostic
- Microturbines
- Battery technology
- Stirling Engines
- Direct Energy Conversion
 - Thermophotovoltaics

Fuel Cells

- Tartical Inverters (Yehicles Must
- · Batisty Spakational
- · On-Board Velice













Government - Industry Team



Working togethamo deliver Tactical Electric Power to our Soldiers, Sailors, Airmen, Marines and Fellow Citizens wherever and

whenever it's needed.





DoD Project Manager Mobile Electric Power

Information / Points of Contact

Phones

Project Management

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Product Manager (Large Generator Sets)

Dr. Parrish

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Chief Engineer



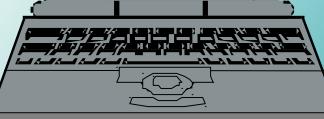


PM-MEP Home Page

- **DOD Directive 4120.11**
- TQG Technical Data
- "What's New"
- Safety of Use Messages
- **Organization and Points of** Contact
- **DOD Generator Master Plan**
- Manuals, Tools, PLL
- **PS Magazine Articles**
- References

MORE!





www.pm-

(i.e. MIL-STDs, ARs, etc.) mep.army.mi

Comments / Recommendations **Solicited**